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| 10/750,597 | 12/31/2003 | John Colgrove | 5760-14900 | 8593 |

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EXAMINER

BROWN, SHEREE N

| | |
|----------|--------------|
| ART UNIT | PAPER NUMBER |
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2163

DATE MAILED: 11/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | | |
|------------------------------|-------------------------------|---------------------------------|--|
| Office Action Summary | Application No. 10/750,597 | Applicant(s) COLGROVE ET AL. | |
| | Examiner Sheree N. Brown | Art Unit 2163 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 31 December 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-41 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-41 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date <u>5/26/04 & 4/11/05</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This action is responsive to the applicant's communication filed on 12/31/2003.
2. Claims 1-41 are pending and presented for examination.

Information Disclosure Statement

3. The information disclosure statement (IDS) submitted on 05/26/2004 & 04/11/2005 was filed after the mailing date of the application 10/750,597 filed on 12/31/2003. The submission is in compliance with the provisions of 37 CFR 1.97. Accordingly, the examiner is considering the information disclosure statement.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless -

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 1-2, 6-12, 14-18, 22-28, 30, and 34-40 are rejected under 35 U.S.C. 102(e) as being anticipated by US Patent Application Publication Number 2004/0049513 to Yakir et al (hereafter Yakir).

Claim 1:

Yakir discloses, a system [See Abstract & Figure 1 (Sheet 1 of 5) & Paragraphs 0009-0016] comprising: a processor [See Figure 2, Item 202 (Sheet 2 of 5) & Paragraph 0028, 0062 & 0074]; and

a memory [See Figure 2, Item 208 (Sheet 2 of 2) & Paragraph 0024-0029, 0208, 0218 & 0220] comprising program instructions, wherein the program instructions are executable by the processor to implement file system software [See Paragraph 0028-0029] comprising a multi-class storage mechanism [(the storage environment) See Figure 1, Item 100 (Sheet 1 of 5) & Paragraph 0023], wherein the multi-class storage mechanism [See Figure 1, Item 100 (Sheet 1 of 5) & Paragraph 0023] is configured to:

- monitor access of data [(monitor storage units) See Paragraph 0023] stored in a multi-class file system [(a plurality of physical storage devices 102 for storing data) See Figure 1, Item 102 & Paragraph 0019 & Paragraph 0023] comprising a hierarchy of storage classes [(Physical storage units 102 may be organized into one or more logical storage units/ devices 104 ... A logical storage unit may reside on non-continuous physical partitions) See Paragraph 0020, 0070, 0090 & 0092] to generate access information for the data [(information related to storage policies and rules configured for the storage environment) See Paragraph 0023], wherein each storage class [(Physical storage units 102 may be organized into one or more logical storage units/ devices 104 ... A logical storage unit may reside on non-continuous physical partitions) See Paragraph 0020, 0070, 0090 & 0092] comprises one or more storage devices assigned [(one or more volumes from logical storage units 104 may be assigned or allocated to servers 106) See Paragraph 0019-0021] to the storage class [(Physical storage units 102 may be organized into one or more logical storage units/ devices 104 ... A logical storage unit may reside on non-continuous physical partitions) See Paragraph 0020, 0070, 0090 & 0092] according to one or more characteristics of the storage class [(each logical storage unit is generally identifiable by a unique identifier that may be specified by the administrator) See Paragraph 0020];

- apply the access information to a set of policies for the multi-class file system [See Figure 1, Item 114 (Sheet 1 of 5) & Paragraph 0023];

- and migrate a portion of the data [See Paragraph 0009, 0011, 0023 & 0049-0053] to different storage classes [(original storage location on a originating volume to a destination storage location on a destination volume assigned to the same server ... that has been migrated) See Paragraph 0063] in the hierarchy of storage classes [(Physical storage units 102 may be organized into one or more logical storage units/ devices 104 ... A logical storage unit may reside on non-continuous physical partitions) See Paragraph 0020, 0070, 0090 & 0092] in response to said application of the access information [(stores information that tracks location of files that are migrated) See Paragraph 0023] to the set of policies for the multi-class file system [See Figure 1, Item 114 (Sheet 1 of 5) & Paragraph 0023]; wherein the migrated data [See Paragraph 0009, 0011, 0023 & 0049-0053] remains online [(destination server are online and available) See Paragraph 0064 & 0076] within the multi-class file system [(a plurality of physical storage devices 102 for storing data) See Figure 1, Item 102 & Paragraph 0019 & Paragraph 0023].

Claim 2:

As per claim 2, most of the claim limitations of this claim have been noted in the rejection of claim 1. In addition, Yakir discloses wherein the file system software further comprises File System functionality [See Paragraph 0028] configured to implement the hierarchy of storage classes [(Physical storage units 102 may be organized into one or more logical storage units/ devices 104 ... A logical storage unit may reside on non-continuous physical partitions) See Paragraph 0020, 0070, 0090 & 0092] of the multi-class file system [(a plurality of

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physical storage devices 102 for storing data) See Figure 1, Item 102 & Paragraph 0019 & Paragraph 0023].

Claim 6:

As per claim 6, most of the claim limitations of this claim have been noted in the rejection of claim 1. In addition, Yakir discloses wherein the multi-class storage mechanism [(the storage environment) See Figure 1, Item 100 (Sheet 1 of 5) & Paragraph 0023] is further configured to initially place the data in the storage classes in the hierarchy of storage classes [(Physical storage units 102 may be organized into one or more logical storage units/devices 104 ... A logical storage unit may reside on non-continuous physical partitions) See Paragraph 0020, 0070, 0090 & 0092] according to the set of policies [See Figure 1, Item 114 (Sheet 1 of 5) & Paragraph 0023].

Claim 7:

As per claim 7, most of the claim limitations of this claim have been noted in the rejection of claim 1. In addition, Yakir discloses wherein the multi-class storage mechanism [(the storage environment) See Figure 1, Item 100 (Sheet 1 of 5) & Paragraph 0023] is further configured to modify [(the originating server modify/ update information stored in a database) See Paragraph 0067 & 0078] file system metadata [(database 112 may be embodied in various forms including a relational database, directory services, data structures, etc.) See Paragraph 0023] for the migrated data to indicate the different storage classes for the migrated data [See Paragraph 0049-0053], wherein path information [(file location information) See Paragraph 0046] in the file system metadata exposed to applications is not modified [(the information

stored in the stub file may be used to find file location information that is then used to locate the migrated data) See Paragraph 0046-0047].

Claim 8:

As per claim 8, most of the claim limitations of this claim have been noted in the rejection of claim 1. In addition, Yakir discloses wherein said migration of a portion of the data to the different storage classes is transparent to an application configured to access the multi-class file system [(the data storage unit becomes transparent to servers and applications) See Paragraph 0020].

Claim 9:

As per claim 9, most of the claim limitations of this claim have been noted in the rejection of claim 1. In addition, Yakir discloses herein the migrated data [See Paragraph 0009, 0011, 0023 & 0049-0053] includes files or portions of files [(Migration is the process where a file data or a portion thereof is moved from an original storage location on an original volume to a repository storage location on a repository volume) See Paragraph 0009-0011 & 0049].

Claim 10:

As per claim 10, most of the claim limitations of this claim have been noted in the rejection of claim 1. In addition, Yakir discloses wherein the migrated data [See Paragraph 0009, 0011, 0023 & 0049-0053] comprises one or more of application data and file system metadata [(meta-data portion of the file may be moved) See Paragraph 0050].

Claim 11:

As per claim 11, most of the claim limitations of this claim have been noted in the rejection of claim 1. In addition, Yakir discloses wherein the file system software is configured to add a new storage class to the hierarchy of storage classes [(reorganize data when deploying new servers) See Paragraph 0006] and wherein the multi-class storage mechanism [(the storage environment) See Figure 1, Item 100 (Sheet 1 of 5) & Paragraph 0023] is further configured to migrate data [See Paragraph 0009, 0011, 0023 & 0049-0053] stored on one or more of the storage classes [(original storage location on a originating volume to a destination storage location on a destination volume assigned to the same server ... that has been migrated) See Paragraph 0009, 0011, 0023 & 0063] to the new storage class [(reorganize data when deploying new servers) See Paragraph 0006] according to the set of policies [See Figure 1, Item 114 (Sheet 1 of 5) & Paragraph 0023].

Claim 12:

As per claim 12, most of the claim limitations of this claim have been noted in the rejection of claim 1. In addition, Yakir discloses wherein the file system software is configured to add a new storage device to a storage class [(reorganize data when deploying new servers and storage devices) See Paragraph 0006] in the hierarchy of storage classes, and wherein the multi-class storage mechanism [(the storage environment) See Figure 1, Item 100 (Sheet 1 of 5) & Paragraph 0023] is further configured to migrate data [See Paragraph 0009, 0011, 0023 & 0049-0053] stored on one or more of the storage classes [(original storage location on a originating volume to a destination storage location on a destination volume assigned to the same server ... that has been migrated) See Paragraph 0009, 0011, 0023 & 0063] to the new storage class

[(reorganize data when deploying new servers and storage devices) See Paragraph 0006] according to the set of policies [See Figure 1, Item 114 (Sheet 1 of 5) & Paragraph 0023].

As per claims 14-18 and 30, the claims have substantially the same limitations as claim 1. These limitations have already been addressed in the rejection of claim 1. Therefore, they are rejected on similar grounds corresponding to the arguments given to the reject claim 1 above.

As per claims 22-28 and 34-40, the claims have substantially the same limitations as claims 6-12. These limitations have already been addressed in the rejection of claims 6-12. Therefore, they are rejected on similar grounds corresponding to the arguments given to the reject claims 6-12 above.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claim(s) 3, 4, 5, 13, 19-21, 29, 31-33 and 41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yakir in view of US Patent Application Publication Number 2004/0039891 to Leung et al (hereafter Leung).

Claim 3:

Yakir discloses the elements of claim 1 as noted above. However, Yakir fails to disclose performance characteristics from a highest storage class comprising one or more high-performance storage devices to a lowest storage class comprising one or more low-performance storage devices.

Leung discloses performance characteristics [(the data storage cost for an storage unit may also be expressed in the form of a label or category or classification such as low cost or high cost) See Leung Paragraph 0038] from a highest storage class [(high cost) See Leung Paragraph 0038] comprising one or more high-performance [(the data storage cost associated with storage units may be used to classify the storage units into one or more groups) See Leung Paragraph 0037-0038] storage devices comprising one or more low-performance [(the data storage cost associated with storage units may be used to classify the storage units into one or more groups) See Leung Paragraph 0037-0038] storage devices [See Leung Paragraph 0037-0038 & 0053-0054].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yakir to include performance characteristics from a highest storage class comprising one or more high-performance storage devices to a lowest storage class comprising one or more low-performance storage devices. The ordinarily skilled artisan would have been motivated to modify Yakir for the purpose of conveniently assisting the user by classifying the data storage units based on cost [See Leung Paragraph 0037-0038].

Claim 4:

Yakir discloses the elements of claim 1 as noted above. However, Yakir fails to disclose migrate less-frequently-accessed data to lower storage classes comprising lower-performing storage devices and to migrate more-frequently-accessed data to higher storage classes comprising higher-performing storage devices according to the set of policies.

Leung discloses migrate less-frequently-accessed data to lower storage classes [(less important file group) See Leung Paragraph 0091] comprising lower-performing storage devices [See Leung Paragraph 0060, 0075, 0107 & 0117] and to migrate more-frequently-accessed data [(more important file group) See Leung Paragraph 0091] to higher storage classes comprising higher-performing storage devices [See Leung Paragraph 0060, 0075, 0107 & 0117] according to the set of policies [See Leung Figure 1, Item 114 & Paragraph 0010 & 0036].

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yakir to include migrate less-frequently-accessed data to lower storage classes comprising lower-performing storage devices and to migrate more-frequently-accessed data to higher storage classes comprising higher-performing storage devices according to the set of policies. The ordinarily skilled artisan would have been motivated to modify Yakir for the purpose of conveniently assisting the user by providing data usage information [See Leung Paragraph 0091 & 0117].

Claim 13:

Yakir discloses the elements of claim 1 as noted above. However, Yakir fails to disclose increase the capacity allocated to a storage class on a storage device within the storage class.

Leung discloses increase the capacity allocated to a storage class on a storage device within the storage class [See Leung Paragraph 0012, 0035-0036, 0047, 0056-0057, 0070-0074 & 0106-0109]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yakir to include increase the capacity allocated to a storage class on a storage device within the storage class. The ordinarily skilled artisan would have been motivated to modify Yakir for the purpose of conveniently assisting the user by optimizing storage utilization for a group of storage units [See Leung Abstract].

Claims 19-20 and 31-32:

As per claims 19-20 and 31-32, the claims have substantially the same limitations as claims 3-4. These limitations have already been addressed in the rejection of claims 3-4. Therefore, they are rejected on similar grounds corresponding to the arguments given to the reject claims 3-4 above.

Claims 29 and 41:

As per claims 29 and 41, the claims have substantially the same limitations as claim 13. These limitations have already been addressed in the rejection of claim 13. Therefore, they are rejected on similar grounds corresponding to the arguments given to the reject claim 13 above.

8. Claim(s) 5, 21 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yakir in view of US Patent Number 6,947,959 to Gill.

Claim 5:

Yakir discloses the elements of claim 1 as noted above. However, Yakir fails to disclose compress data migrated to one or more storage classes in the hierarchy of storage classes.

Gill discloses compress data [See Gill Column 6, Lines 46-51] migrated to one or more storage classes in the hierarchy of storage classes [See Gill Column 2, Lines 49-52 & Column 6, Lines 46-51]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Yakir to include compress data migrated to one or more storage classes in the hierarchy of storage classes. The ordinarily skilled artisan would have been motivated to modify Yakir for the purpose of conserving storage space [See Gill column 6, Lines 46-51].

Claims 21 and 33:

As per claims 21 and 33, the claims have substantially the same limitations as claim 5. These limitations have already been addressed in the rejection of claim 5. Therefore, they are rejected on similar grounds corresponding to the arguments given to the reject claim 5 above.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US Patents (5822780, 6804719, 6961811) & USPGPUB (20030225801, 20040054656).

Contact Information

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sheree N. Brown whose telephone number is (571) 272-4229. The examiner can normally be reached on Monday-Friday 7:00 AM - 3:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Safet Metjahic can be reached on (571) 272-4023. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

11. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

S. Brown
Patent Examiner, Art Unit 2163
Technology Center 2100
November 23, 2005

